TAGHeuer
PROFESSIONAL TIMING

Matrix Display
HL 970

User's Manual

Version 05/2010

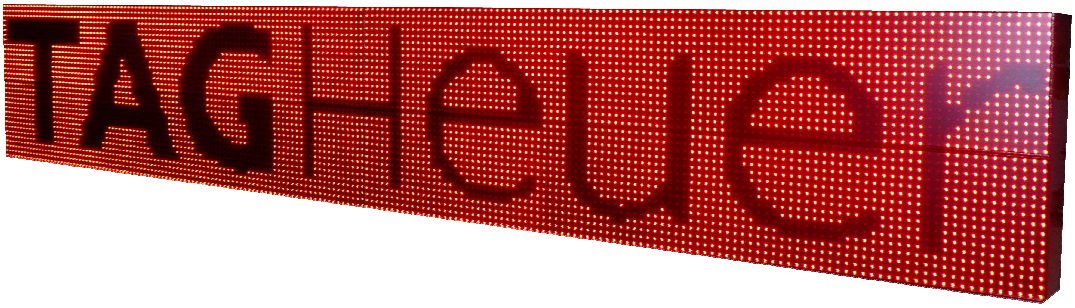


Table of contents

1. System Overview **3**
2. System Composition **4**
2.1. Full Matrix Display HL 970 Unit 4
2.2. Control Box 5
2.3. System Modularity 6
2.4. Cables 8
3. "Easy Display" Software **9**
3.1. Software Structure 9
4. Communication (Setup) **10**
5. Configuration (line conf.) **10**
5.1. Number of Lines (Display Addressing) 10
5.2. Display Height 10
5.3. Line 10
5.4. Create Lines 11
5.5. Configuration Examples 11
5.6. Vertical Display Option 11
6. CP 540 Setup (CP540 Config) **12**
6.1. Configuration of the Display HL 970 12
6.2. Names File 14
7. Diagnostic **14**
7.1. Time and date of the Control Box 14
7.2. Address and Line 14
7.3. Visual LED test 14
8. Text **15**
8.1. Menu 15
8.2. Text Menu 15
8.3. Counter Menu 16
8.4. Scrolling Row 16
9. Image **17**
9.1. Menu 17
9.2. Image editor 17
9.3. Import image 18
10. Programs **19**
10.1. Menu : 19
11. Memory Management **20**
12. System information **20**
13. System update **20**
14. Characteristic **21**
14.1. LED panel 21
14.2. Protections 21
14.3. Timing 21
14.4. Timing Protocol 21
14.5. CP540 Protocol 22
14.6. Standard Protocol 22
15. Note **23**

1. System Overview

The LED Panel **HL 970** is a modular system for the management of LED displays.

The system has the capability to visualize both alphanumeric and graphic pages.
The basic of the system is a LED panel with a resolution of 96 x 16 pixels.

Panels may be placed side by side both horizontally and vertically to create a higher resolution display.
The maximum number of panels managed from the system is 16.

The system may directly interface with Tag Heuer timing software. Communication is made by serial link in both RS232 and RS485 standards.

The 12 V Power supply section as well as the mother board are built into the Control Box units.

The TAG Heuer Software "**Easy Display**" is furnished to assist with the system management.

Easy Display provides a special menu for the Chronoprinter CP 540, system configuration, diagnostics and management of text, graphics abilities and display program.

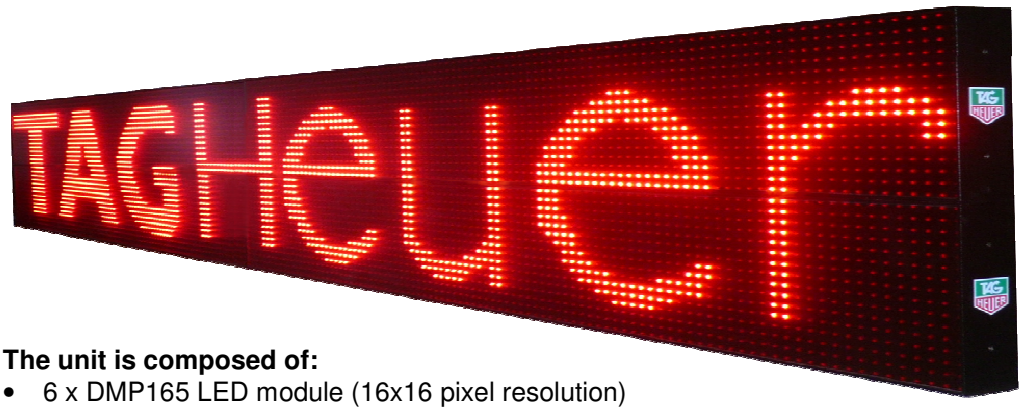
The LED Panel **HL 970** system can operate either from a host PC – Slave mode - or as a master unit executing programs in its own internal memory – Master mode

Main features of the System:

- LED Panel Unit with 96x16 pixel (LED) resolution
- Up to 16 panels
- Refresh Rate in both Timing and graphic mode: 30 msec (3 Hz)
- Direct interface to **Tag Heuer Timing** software
- Video Programs composed of:
  - Alphanumeric pages with date & time fields
  - Graphic pages - bmp monochrome format
  - Master or Slave mode
  - Internal Flash Memory: 1 Mbytes
  - Internal Rtc (Watch) with 5 ppm quartz
  - Operating Temperature: –20..+50 °C
  - Main Power : AC voltage 85..264 VAC - 47..63 Hz or DC voltage in range 10..30 VDC
  - Diagnostics
  - Pixel (LED) error (open or short)
  - Temperature measurement of Panel and Control Box units
  - Temperature protection
  - All units are firmware upgradable

2. System Composition

2.1. Full Matrix Display HL 970 Unit



The unit is composed of:

- 6 x DMP165 LED module (16x16 pixel resolution)
- Control Unit THCPU
- Fan 120 mm 12VDC

In Alphanumeric mode the LED panel can be set in:

- 2 lines of 16 characters of 11 cm
- or 1 line of 8 characters of 22 cm

External connection is made by a 4 pin IP68 circular connector.

Standard supply voltage is 24 VDC, it is also possible to use a voltage supply in the 10 - 30 VDC range.

Main features:

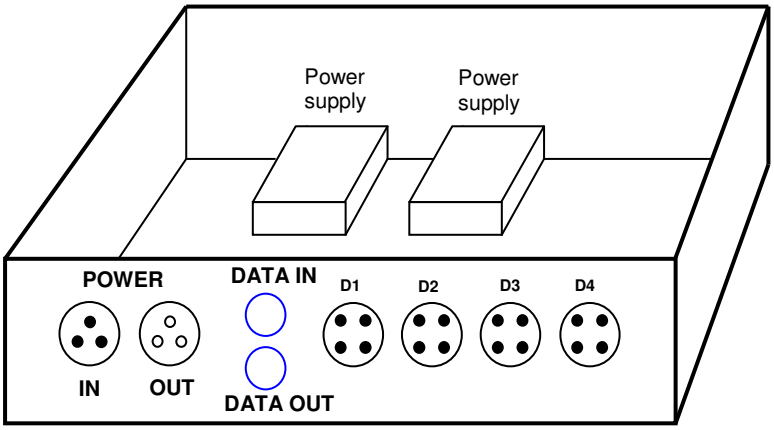
- Resolution : 96 x 16 pixel.
- Input Power : limited to 75 W
- LEDs : Red 624 nm - 110/40° - 1520..2130 mcd
- Operating Temperature : - 20°C to +50 °C
- Communication : 2 wires RS232 or RS485 serial link
- Dimensions : 1585 x 265 x 85 mm
- Weight : 11 Kg

Other features:

- LED Open / Short detection
- Digital temperature sensor on every LED module
- Supply voltage measurement
- Input Filter with protection for inverse polarity

2.2. Control Box

There are 2 versions
Control Box HL 970-2: with 1 power supply 24VDC and 2 panel lines connectors.
Control Box HL 970-4: with 2 power supplies 24VDC and 4 panel lines connectors.



Control Box composition:

- 1 or 2 power supplies 24 VDC 150 W
- The Power module:
  - Main power input IP68 3 pin male connector
  - Main power output IP68 3 pin female connector
  - Ctrl Line input IP68 8 pin female connector
  - Ctrl Line output IP68 8 pin female connector
  - Slave power output IP68 3 pin female connector
  - 2 or 4 Panel lines IP68 4 pin female connector

Main features:

- Plastic Box : 394 x 314 x 126 mm IP56.
- Main supply : 85..264 VAC 47..63 Hz (automatic)
- Max Power 2x : 150 W max
- Max Power 4x : 300 W max
- Operating Temperature : -20..+50 °C

Power Supply features:

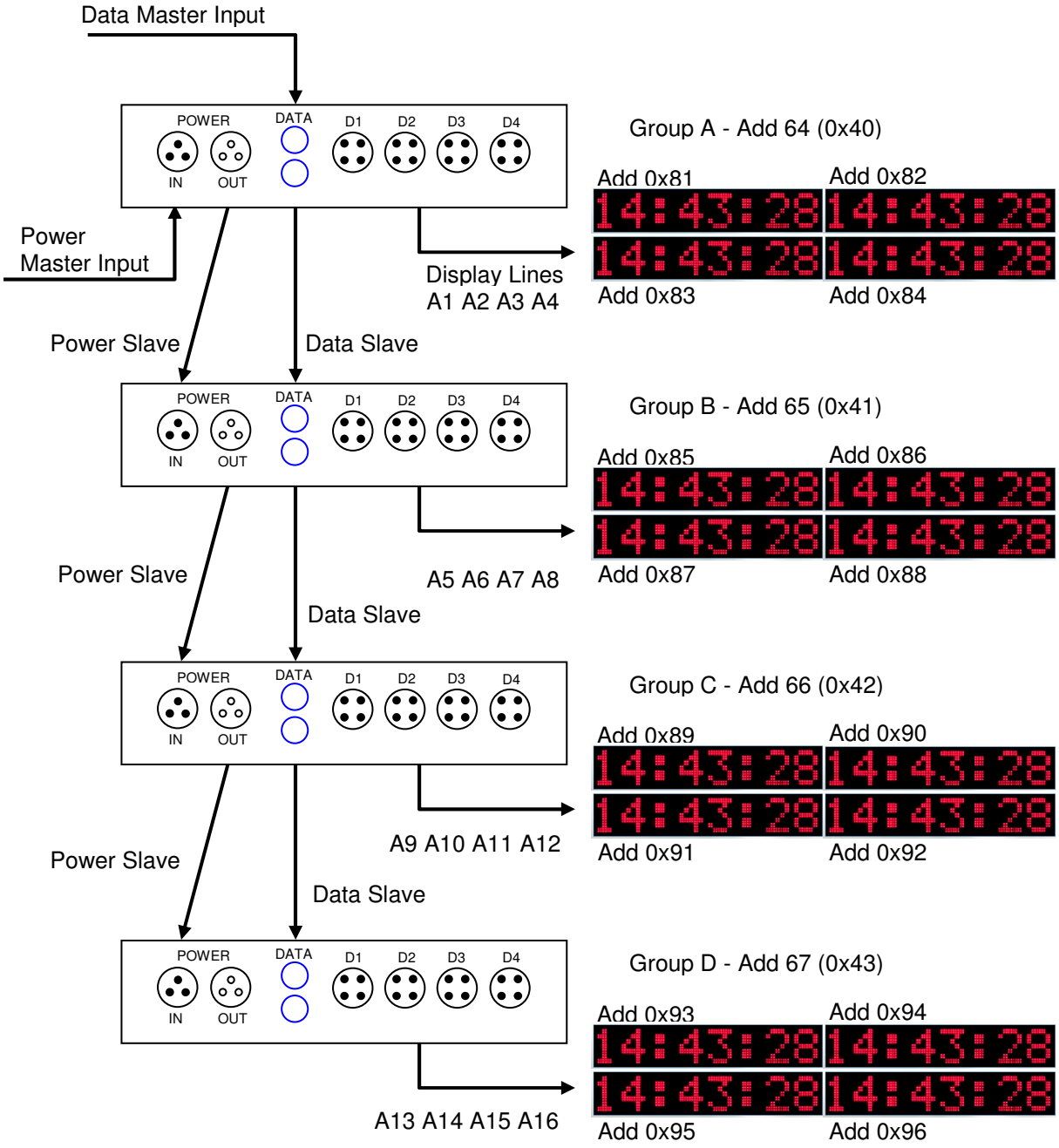
- V out : 24 VDC 150 W – 225 W peak (8 sec)
- Active PFC (Power factor correction)
- Overload / Short circuit protection (auto recovery)
- Efficiency : 87%
- Temperature : -20..- +70 °C
- Derating : 2% /°C per Ta > 50 °C

Other features:

- Communication lines:
  - RS485 + RS232 input ctrl line
  - RS485 output
  - 2 (4) x RS485 display lines
- Possibility to supply the system by DC voltage source in the 10 - 30 VDC range (internal connector)
- 10 A Protection fuses for every display line
- Digital temperature sensor
- CPU Risk 32 bit - 60 MHz
- Rtc with battery backup – 5 ppm quartz
- Flash Memory 1 MBytes

2.3. System Modularity

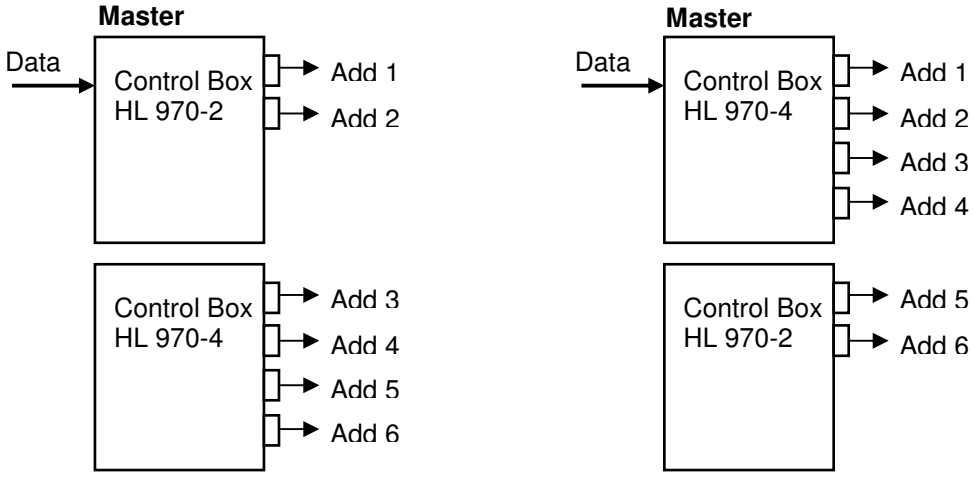
Every Control Box manages up to 4 display lines.
It is possible to connect up to 4 Control Boxes in series, for a total of 16 display lines:



The address of every unit is consistent with its position in the system.
Address sequence always starts from the master Control Box

It is possible to have both types of Control Box in the same system. Addresses are always consecutive.

Some examples:



Panel connection is always made starting from the left top side and going left to right and top to bottom.

Examples:

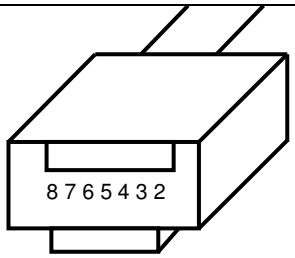
Graphic Area 288 x 48

Add 1	Add 2	Add 3
Add 4	Add 5	Add 6
Add 7	Add 8	Add 9

Graphic Area 96 x 64

Add 1
Add 2
Add 3
Add 4

2.4. Cables

Function	Connector	Pinout	Cable
Display Cable **Display cable adapter**	2x PX0748/P/04	1: 24V 2: 0V 3: 485- 4: 485+	2x1.5mmq + Twisted pair AWG24
Slave Data Cable	2x PX0410/08P/6065	1: 24V 2: 24V 3: Tx RS232 4: 485+ 5: 485- 6: Rx RS232 7: GND 8: GND	UTP Cable 8
Power	PX0731/S/03		3x 2.5mmq
	Max Current: 1200/115 = 10.5A (Main power)		
Power Slave	PX0731/S/03		3x 2.5mmq
Master Data Cable	PX410/08P/ 6065	1: 24V 2: 24V 3: Tx RS232 4: 485+ 5: 485- 6: Rx RS232 7: GND 8: GND	
	RJ45	 1. 24V 2. 24V 3. Tx RS232 4. 485+ 5. 485- 6. Rx RS232 7. NC 8. GND	
CP 540	RJ45 → Sub9D male	3 → 2 (Rx RS232) 6 → 3 (Tx RS232) 8 → 5 (GND)	

3. “Easy Display” Software

3.1. Software Structure

The software is designed to operate in Windows 2000 / NT / XP / Vista

The software consists of these main sections:

- **Setup**
  - Com Port selection

- **Configuration (line conf)**
  - Display number assignment both Horizontally & Vertically
  - For every display:
    - 2 lines of 16 characters height 11 cm.
    - 1 line 8 of characters height 22cm.
  - Line definition:
    - Line number
    - Special Line with name

- **Configuration CP 540 (CP 540 conf.)**

  Allows configuring a direct connection between the Chronoprinter 540 and one matrix Display HL970, without passing by a software (off-line)
  The display possibilities are:
  - Time-of-day
  - Running Time of the race
  - Speed (calculated by the CP 540)

  These configurations are fixed. The download of an Excel files including the bib number, name and first name, makes possible to display not only timing information but also personal information.

- **Diagnostic**
  - - Setting of the time-of-day of the control box
  - - Display of the memorized time-of-day
  - Visual test of displays address
  - Visual LED Test for rows and columns
  - Test LED (open and short detection)
  - Read internal Temperature of the control box.
- **Text**
  - Text editor for advertising or information
  - Option Count-down, Count-up and LAP
  - Scrolling text function (up to 200 characters)

- **Image**
  - Image editor for advertising (in .bmp file)

- **Programs**
  - Programs editor for advertising
  - Memory management
  - Management of the advertising memorized in the control box

- **Upgrade**
  - Check configuration (hardware and software) of the system and update the CPU of the Control Box, Display and LED

Important

OFFLINE When you connect the Display to a PC, it is imperative to check the current memorized configuration in the Control Box (Menu Line Conf. - Read). When the Easy Display configuration is different from the Control Box, the **OFFLINE** statute will be displayed. It will be thus necessary to make a Read or Load to modify the statute.

On the top-left of the software's screen, you can change the brightness of the displays.

This button allows you to clear all the displays.

4. Communication (Setup)

Enables you to select the Port number you will use to drive the Display HL 970 with your PC.

5. Configuration (line conf.)

5.1. Number of Lines (Display Addressing)

Select the number of displays vertically and horizontally.
The screen will mimic the configuration.
Configure

Warning:
If you change the configuration of your Control Box, the memorized "Text" will not be saved.
The memorized Texts are related to the definition / configuration of the system.

5.2. Display Height

Every Panel can operate as:

X2: 2 lines of 16 characters (total of 32 characters) – 11 cm high → Select Display High.
X1: 1 line of 8 characters – 22 cm high → Select Display High.

The option « **ALL** » allows you to configure all the displays in a row.

5.3. Line

Show the soft address of the selected display, this can be changed manually (warning see also the hard address chapter 2.3).

The modification of the Soft-Address may be done with the menu "**Line**" or directly on the display.

- Click the left mouse button: increase the address
- Click the right mouse button: decrease the address.

When the "**Show repetition**" option is activated, it will avoid conflicts of addressing e.g. 2 similar soft-addresses, the concerned address will flash to warn you.

Trick: in the "**Diagnostic**" menu – "**Line test**" will confirm the actual settings of your display(s)

Once configuration is complete, you need to "**Send**" it to the displays.

Warning

it is possible that the function "**Send**" and "**Read**" will not work if you have the function "**Reading time**" activated in the menu "**Diagnostic**"

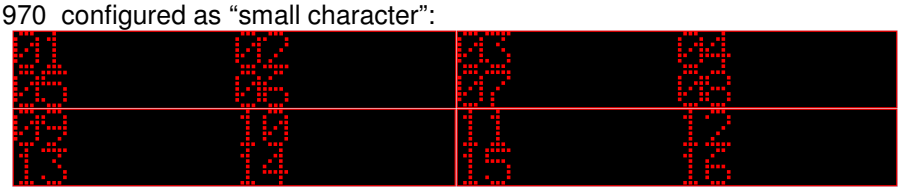
At each modification of the configuration of the display, the message "**OFF LINE**" will be showed. It indicates that the "control box" and the PC are not any more set on the same configuration.
By pressing **READ/SEND**, one will find the statute "**ON LINE**".

5.4. Create Lines

This is an automatic numbering process for the soft-addresses. This avoids having to manually enter all line addresses.

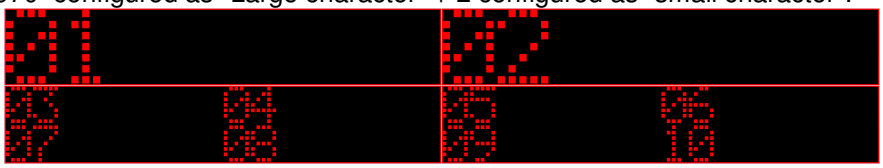
5.5. Configuration Examples

4 x HL 970 configured as "small character":

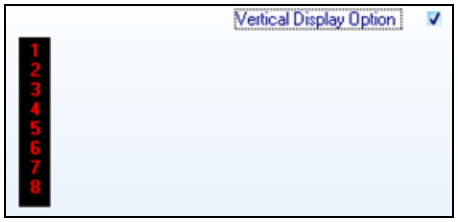


4 x HL 970 configured as "Large character":

2 x HL 970 configured as "Large character" + 2 configured as "small character":



5.6. Vertical Display Option



It is possible to set a maximum of 4 x HL970 displays in vertical position.
Only the text would be vertically positioned.

Warning

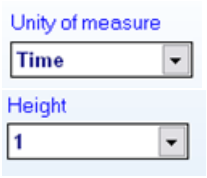
If an asterisk is displayed, this is related to a specific CP 540 configuration. (see chapter 6)

6. CP 540 Setup (CP540 Config)

This menu allows you to use the Display HL 970 with a Chronoprinter CP 540.
It is possible to upload an Excel file with bib Number and name to the Control Box.
When the CP 540 sends timing information (running time, speed) the control box will display the memorized info (bib number & name) from the uploaded Excel file.

6.1. Configuration of the Display HL 970

The positioning of the timing information is fixed and cannot be modified. We consider the Displays of 8 characters (4 displays: height of character 11cm, 1 display: height of characters 22cm).



Measuring unit:

- Time : running time
- Speed : selection of different units of speed

Value 1 : 1 x Display = character height of 22cm
Value 2 : 4 x Displays = character height of 11cm

Note

Configuration of the CP540

- Menu **Parameter**
- Select : RS232
- Select : TAG Heuer HL960/HL990
- Baud Rate : 9600 Bds
- Running Time

While clicking on a display, the colour will switch to blue. This means that the display is activated for the CP 540 configuration.

Important

It is necessary to update the Control Box by selecting:
- Send: to send the new configuration
- Read: to read the configuration of the Control Box

Important

In the Menu **Line Config** (see chapter 5) , an asterisk will be posted on the configured displays for the CP540

TIME:

During the race

B	I	B		1	2	:	3	4	.	5	6				
F	I	R	S	T	-	L	A	S	T		N	A	M	E	

End the Finish

R	k	:		R	N	K				T	I	M	E		
F	I	R	S	T	-	L	A	S	T		N	A	M	E	

SPEED:

1	2	3	.	3	4		K	M	/	H			R	N	K
B	I	B		N	A	M	E								

Km/H, m/s, MPH/H fixed text to be defined

BIB : 3 characters - number of departure
Time : 8 characters (min : sec)
RNK : ranking (classification)
Surname– Name : information is loaded into Control Box memory

Protocol example of Time Mode, Start-Finish, Speed.

1. **Competitor number and time on line 0**

   <STX> L 0 **<HT>** A _ 5 2 **<HT>** _ 5 : 3 1 : 3 6 . 2 9 2 **<HT><CR><LF>**

2. **Classification and Competitor number on line 1**

   <STX> L 1 **<HT>** A _ 2 1 **<HT>** _ _ _ _ _ _ 5 2 : _ 2 1 **<HT><CR><LF>**

3. **Speed measure N° 1 on Line 2**

   <STX> L 2 **<HT>** A _ _ _ **<HT>** _ _ _ _ _ 2 9 2 . 5 9 0 **<HT><CR><LF>**

6.2. Names File

This Menu is used to synchronize the configuration between the CP 540 and the Full Matrix (see chapter 3.1)
Possibility to modify a excel file with the competitor name and bib Number.

This application allows to :
- Upload an existing excel file.
- Configure the different columns (Bib Number, Name, Surname)
- Position the memorized info

This application allows to:
- Visualize (Read) the memorized file in the Control Box
- Download (Save) the Control Box information (file) onto a PC/LapTop.

7. Diagnostic

7.1. Time and date of the Control Box

- **Update (Synchronization)**
  Synchronization of the time of the "**Control Box**"according to the computer's date and time.

- **Reading**
  Show the actual "**Control Box**" date and time.
  Note that the date and time are only showed on the PC screen. You will also be able to visualize the temperature of the displays.

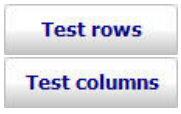
  E.g.: If you change your OS Date & Time, pressing "**Update**" will update the software and displays date & time. Then you can control the changes you've done by hitting the "**Reading**" button (not sent on the displays, only on the software).

7.2. Address and Line

- **Address visualization**
  Display the hard-addresses of the displays. This function may be very useful if you have a large display configuration, so you can check if the cables are correctly connected.
  The hard-addresses will impact directly on the soft-addresses (see chapter 2.3)

- **Line Test**
  Display the soft-addresses (Configuration) of the displays

7.3. Visual LED test



Test every row one-by-one

Test every column one-by-one

Rythm of test may be changed in the small input box below the buttons (min 100 msec).

Entering a single number in the input box will test a single row (between 1 and 16) respectively a single row (between 1 and 96) on the display(s).

8. Text

8.1. Menu

According to your configuration (soft-addresses of the displays), you can write a text and send it to the displays.

The text editor includes the following different options:

Open: a text file gives you the possibility to visualize the text of the display on the PC screen.

New: Erase visible screen information and prepares a new page of text

Open: a text file already published. The text files are memorized in various Repertories (ex Images_192_32: configuration of 4 lines)

Save: the visible text on the PC the screen (in *.txt).

Save as: to modify a .txt file name

Cancel: to clear all your virtual displays

Time: display the time of the Control Box if the GPS option is installed (external module connected via the DATA line). The displayed time will be automatically synchronized at the GPS time-of-day.

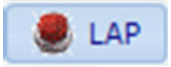
°C, Temperature in Celcuis, shows the Air Temperature, the sensor is located in GPS Modul (in option)

RH Air humidity, in %, the sensor is also located in the GPS Modul (in option)

Date: display the current date of the Control Box.

Count UP: of a time available in different formats (possibility to display the 1/10 of sec. (refer to point 8.3 **Counter**)

Count Down: of a time available in different formats (refer to point 8.3 **Counter**).



LAP: allows counting the Laps manually (refer to point 8.3 **Counter**).

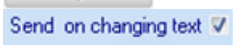
Blinking: allows blinking selected timing information of the Display. Information under this format will be visualized on the screen in italic.

Allows formatting text (left, center, right-hand side), by taking all the length available of the display (or of a group of displays)

8.2. Text Menu

Send all but empty lines: send only to the configured display(s)

Send all lines : update of all displays



Automatic update of the displays information following the modifications done on the PC.

8.3. Counter Menu

This menu is specifically dedicated to the management of the 3 following functions:
Count-UP, Count-Down, LAP.
It is possible (after having selected the display) to start a countdown, Count-up or a Lap and also to stop the process.
It is also possible to start all the displays simultaneously.

8.4. Scrolling Row

This menu allows you to scroll a text (up to 200 characters) over the entire length of a display (or of a group of displays).
It is possible to scroll a text with small characters (“x1”) or big characters (“x2”).
It is necessary to validate the option **Enable Scrolling row** to be able to write the text.
You can easily define the display(s) you wish by confirming it.

Activate the scrolling on the selected display.

Stop the scrolling on the selected display.

Warning

All the characters are available in the Text menu / Scrolling (ä, à, é, è, ö, ë, etc.)
Note that there is a restriction of the use of the special characters when the display(s) HL 970 is used with software including MSports Pro, Ski Pro, Jumping Pro or Circuit Pro.

9. Image

9.1. Menu

New: Erase visible screen information and prepare a new page of text.

Save: the visible text on the PC the screen (in *.txt).

Save as: to modify a .txt file name.

Import a new image (see chapter 9.3).

Undo / **Redo** the last action.

Cancel: to clear all your virtual displays

Reverse the diode lightening (black/white – positive/negative).

9.2. Image editor

This menu is an image editor. Can be used to edit and create different images for advertising (logo, text etc).

This is the tools menu of the image editor you can find on the left of the screen; it is very similar to the “Paint software” from Microsoft Windows, with some useful basic options.

You can zoom, draw, select, paint, erase, fill, etc.

Anything you need for image editing

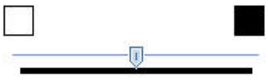
Some functions are available only if a specific tool is selected:

Selection
Polyline
Text

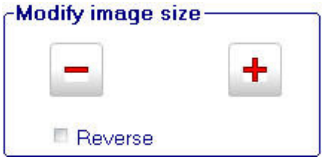
On the Right of the screen, you have the list of the different images currently available.
With a right-click of the mouse, further menu options are available in a drop down menu including delete.

9.3. Import image

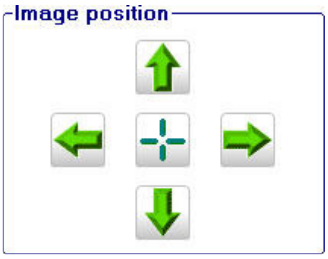
This menu allows you to import a file (Tiff, JPEG, PNG etc) with the button “open”
You will be able to modify the image with different tools.



On the top right with this tool you can change the level of black (on the top right of the window.



Modify the size of the image. You can increase and decrease the size.
“**Reverse**” Changes the black in white and vice versa.



Change the position of the image.
The arrows move the image.
The cross in the middle centralizes the image

Once you are happy with the image, use “**OK**” to return to the menu “**Import image**”
From this stage, you will be able to change and correct it manually.

- **Send**
  Send the image from the Image editor to the displays.

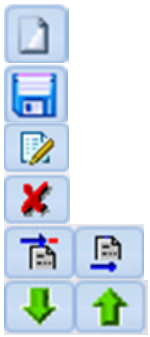
- **Load**
  Allows loading an image file (Monochrome Format only) and send it directly to the displays.

Important: The use of an image not in accordance with the system configuration is not supported.

10. Programs

This menu allows you to edit a program of advertising (which can be displayed when you wish).

10.1. Menu :



New: Erase visible screen information and prepares a new page of text.

Save: the visible text on the PC the screen (in *.txt).

Save as: to modify the name of .txt file.

Erase the selected program.

Insert / **Add** a .txt file or an image.

Move DW / **Move UP** a .txt file or an image sequence in a program.

First, you need to open a new "**Program**". It is possible to have several programs recorded. Only one program will show at one time (it is highlighted in blue). E.g.:

For each program it is possible to define a sequence of Text or Image (File).
For each Sequence several parameters must be defined:

Time: Time of duration of a sequence
Caution: when a text includes scrolling, the sequence time …????

Canc: Previous (NO/YES)
NO: the next image effect will be replaced by the next image.
YES: the image will be erased and will then be replaced by the new image.

Effect:
Only the images can have an entry effect.
The texts appear without effect.

Appear without effect

Scrolling of the image by the right side

Scrolling of the image by the left side

Scrolling of the image by the bottom side

Scrolling of the image by the top side

The control panel allows managing your program using the keys: "Play", forward, backward, etc. The effects are not visible on the screen.
When the program is launched you can stop it at any time by pressing on Stop.

Important:
If you change the configuration of your Displays (for example the address of the displays), the programs will be also affected (text).

11. Memory Management

This menu allows downloading software from the PC to the Control Box.
The memorized programs could thus be activated very quickly.

If you activated a program (run) and turn off the Control Box, the selected program is memorized and would be ready to use when you switch the Control Box on.
This very useful function will allows you to install the Display anywhere, without any connection with a PC and to have advertising messages displayed.

Your screen is divided in two.

- On the Left side:
  You have the Programs which you have defined beforehand (see chapter 10).
- On the Right side:
  You will find the programs already memorized in the Control Box.

It is possible to memorize up to 16 programs in the Control Box.

To download one or more programs from the PC to the Control Box: select (✓) on the left side and activate the button to transmit the files.

It is possible to define for each program, the sorting of the memory BANK of the Control Box.

On the right side of the screen, you will find the following information:

N° Bank	: memory position of the program.
Play	: status (Run / Stop).
Program Name	: name of the program.
Size (%)	: size in %.
Date	: Date and time of the creation of the program.

Tow buttons are at your disposal at the bottom.

Erase the memorized programs of the Control Box.

Read the memory of the Control Box.

12. System information

Find all useful information at the bottom of the screen.

- The status of your connection (**ONLINE** / **OFFLINE**).
- The selected port COM.
- The actual configuration (2x2) – see chapter 5).
- The actual resolution in pixel (192x32 for example).

13. System update

You will find the Update menu at the top of the screen.
It allows the update the Display HL 970 and the Control Box.

It is imperative to connect the display HL 970 to carry on the update of all the display's and of the Control box simultaneously.

This function will verify the configuration and which equipment is connected.
The update of the Control Box and then, of the display will be done automatically.

It is possible to see the configuration files by clicking on: Show Firmware.

14. Characteristic

14.1. LED panel

LED Panels wired together will form a higher resolution display.

Input data are in bmp monochrome or in ALF (structured alphanumeric) format.

- Max page size = 32*6*9 = 1728 bytes.
- Tframe < = **30 msec**

Graphic functionality is available in both Master and Slave mode.

14.2. Protections

Every protection is calculated and acts separately.

- Frame Power: is calculated frame by frame for every panel and is limited to 75 W. Calculation is made by display units
- Panel Temperature: derating starts at 50°C, pwm is reduced up to 5% when T >= 70°C. Calculation is made by display unit
- Control Box Temperature: derating is of 2% for temperature > 50°C. Calculation is made by the Control Box unit

14.3. Timing

Display line refresh	30msec (30 Hz) The refresh cycle starts every 30msec. Block Data are sent to slaves Control Box. Every Control Box executes the refresh cycle for its panel lines. Memory is used as a double buffer, the first one with data received from Ctrl Line, the second with data to be transmitted to panel lines. Every buffer has a dimension of 1728 bytes.

14.4. Timing Protocol

This Protocol corresponds to the Ski Pro, Jumping Pro, Circuit Pro and Msports Pro softwares.

Format 8/N/1 – Standard Baud rate: 9600 baud

Frame structure: **STX NL**XXXXXXXX **LF**

STX = Start of Text (0x02)
N = Line number 0..39 , '1'..'9', 'A' + (linea – 10)
L = brightness level ('1'..'3')
X = characters
LF = end of Frame (0x0a)

Character Set:

ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890/\()':.*
-+abcdefghijklmnopqrstuvwxyz

T line = 10/9600 x 12 = 12.5 msec

Timing is the default protocol at power on.
When activated, the graphic protocol is stopped on timeout condition - 10 sec without valid messages from master unit.

14.5. CP540 Protocol

Format 8/N/1 – Standard Baud rate: 9600 baud

Available baudrate: 2400 / 9600 / 38400 / 57600 baud

Frame structure, 24 characters:
STX 'L' N TAB 'A' nnn TAB Time TAB CR LF

N°	Characters	Description	Code	Info
1	1	Command Start	02h	Start of Text
2	1	L = Line	4Ch	
3	1	Line number	0…9	Line selector
4	1	Horizontal tab	09h	
5	1	A = 'alphanumeric'	41h	
6-8	3	Competitor number	000…999	
9	1	Horizontal tab	09h	
10-21	12	Time value		Hh:Mm:Ss.DCM
22	1	Horizontal tab	09h	
23	1	Carriage Return	0Dh	
24	1	Line Feed	0Ah	

14.6. Standard Protocol

This protocol is used on Master Data line, Slave Data Line and Display line.

Format 8 / N / 1 - Standard Baud rate = 115'200 baud

- **Standard Request Format:**

  <EOT> <EOT> <ADD> <STX> CODE [ASCII_DATA] **<ETX> <LRC>**

- **Standard Answer Format:**

  <EOT> <EOT> <ADD> <STX> 'D' CODE [ASCII_DATA] **<ETX> <LRC>**

<EOT> : 0x4
<STX> : 0x2
<ADD> : address 0..255 – 0 = general address
<LRC> : check sum of all bytes in command string from STX to ETX
ASCII_DATA : binary data must be transmitted in 2 characters (ex. 0xF8 => 'F8')

Answer Characters:

<ACK> <ACK>	0x6 0x6	= Command successfully executed
<NAP> <NAP>	0x9 0x9	= Command parameter not valid
<NACK> <NACK>	0x15 0x15	= Command unknown

15. Note

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